U.S. Army Space and Missile Defense Command
Space and Missile Defense Technical Center
Weapons Directorate

Solid State Laser

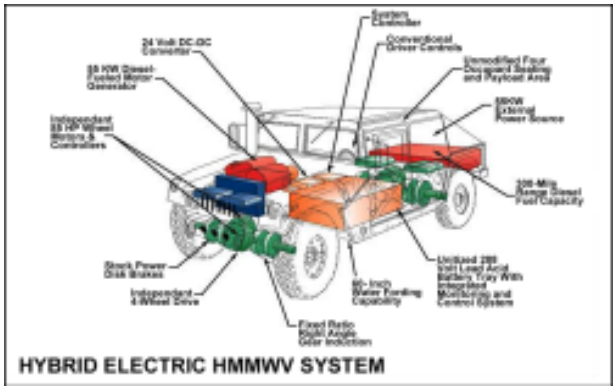
Developing Technology for a Tactical Laser Weapon

The Solid State Laser program is geared to develop and integrate diode-pumped laser technology necessary to produce a compact tactical weapons-level laser device. This device will be capable of "Protecting the Force" for Army Vision 2010 against threats such as unmanned aerial vehicles, rockets, artillery, and mortars.

The SSL program directly supports the U.S. Army Air Defense Artillery School's Enhanced Counter Air Capability of the Joint Theater Air and Missile Defense Mission Needs Statement, dated July 1999. This mission will require mobile laser power levels in the few hundreds of kilowatts.

The SSL development focuses on the designing and fabricating a proof-of-principal SSL weapons-level device. The SSL will ultimately be integrated at the High Energy Laser System Test Facility at White Sands Missile Range, N.M., where it will be tested against dynamic threats.

Since the SSL's operational characteristics require it to be compact, lightweight, all-electric and having excellent atmospheric propagation, the SSL weapon could be placed on highly mobile, lightweight platforms such as the High Mobility Multi-purposed Wheeled Vehicle. The Hybrid Electric HMMWV System now under develop offers not only an effective platform, but its diesel-fueled motor generator could provide a cost-effective power source for the SSL.



Initially, a baseline heat capacity SSL system was defined, laser technology risks were identified and risk-reduction experiments were performed. As a part of this risk reduction, a flashlamp pumped single prototype module was designed and built to evaluate illumination uniformity, edge cladding, and wavefront correction subsystems and techniques.

The program is now nearing completion of a demonstration of intermediate scale hardware. In this demonstration, the single module design has been upgraded and replicated to produce a subscale prototype system consisting of multiple flashlamp pumped modules capable of lasing at 10 kilowatt heat capacity burst power.

The next major goal is to take the existing subscale system device and upgrade it to full weapon level by replacing the flashlamp-pumping source with a laser emitting diode-pumping source.

During the third step, when the cost of the laser diodes is at an attractive level, the flashlamps will be replaced with diodes to increase the power and repetition rate by an order of magnitude.

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